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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/674,594	09/29/2003	George D. Vernstrom	58460US002	4487

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EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 07/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/674,594	VERNSTROM ET AL.	
	Examiner	Art Unit	
	Thomas H. Parsons	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment

This is in response to the Amendment filed 25 may 2006.

(*Previous*) DETAILED ACTION

Specification

1. The objection to the disclosure because of minor informalities has been **withdrawn** in view of Applicants' Amendment.

Abstract

2. The objection to the abstract has been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-25 **stand** rejected under 35 U.S.C. 103(a) as being unpatentable over Debe et al. (5,879,827).

Claim 1: Debe et al. disclose a fuel cell cathode catalyst comprising nanostructured elements which comprise microstructured support whiskers bearing nanoscopic catalyst particles, the nanoscopic catalyst particles made by alternating application of first and second layers (abstract) comprising platinum, iron and second

metal selected from the group consisting of Group VIb metals, Group VIIb metals and Group VIIIb metals (col. 10: 14-36).

Debe et al. do not specifically disclose

a first layer comprising platinum and a second layer being an alloy or intimate mixture of iron and a second metal selected from the group consisting of Group VIb metals, Group VIIb metals and Group VIIIb metals other than platinum and iron,

where the atomic ratio of iron to the second metal in the second layer is between 0 and 10,

where the planar equivalent thickness ratio of the first layer to the second layer is between 0.3 and 5, and

wherein the average bilayer planar equivalent thickness of the first and second layers is less than 100 Å.

However, Debe et al. disclose that "The catalyst particles of the present invention may have alternating layers of different catalyst materials which may differ in composition, in degree of alloying or in degree of crystallinity. By varying the thicknesses of the
individual layers the stoichiometry of the bulk and the degree of alloying can be changed. By controlling which deposition sources are on or off and how much power is provided to the deposition sources during the final passes of the substrate in front of the sources, the surface composition can be controlled. The surface composition of the catalyst particle can have a different composition than the bulk composition of the particle." See col. 4: 27-40.

Further, Debe et al. disclose that "The process and apparatus of the present invention allow selective modification of the stoichiometry, degree of alloying, degree of crystallinity and crystallite morphology of the bulk of the catalyst coating as well as the surface composition. These can be changed by varying the relative deposition rates of the individual layers, by varying the power, throw distance, or duration of any of the sources. Furthermore, the composition and structure of the catalyst can be altered by including additional components in the sputtering gas. Any known sputtering gas additives may be used, reactive or unreactive with the deposited material and whether incorporated into the catalyst as a constituent or dopant or not. Additives may include noble gasses, halogens, group VII elements, and preferably argon and oxygen. If sufficient isolation of the different vacuum deposition stations is provided, layered mixtures can be created which incorporate additives only in selected layers or which incorporate different additives in different layers." See col. 14: 52-61. See also col. 10: 14-36 and 55-59, col. 10: 63-col. 11: 3, and col. 12: 43-col. 13: 17.

Therefore, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., which are similar to those instantly disclosed, to provide the claimed first and second layer compositions, atomic ratio, planar equivalent thickness, average bilayer planar equivalent thickness.

Claim 2: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., which are similar to those instantly disclosed, to provide a planar equivalent thickness ratio of the

first layer to the second layer between 0.3 and 2.5, and wherein the average bilayer planar equivalent thickness of the first and second layers is greater than 8 Å.

Claim 3: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., which are similar to those instantly disclosed, to provide an atomic ratio of iron to the second metal in the second layer between 0.01 and 10.

Claim 4: Debe et al. on col. 10: 25 disclose a metal selected from the group consisting of nickel, cobalt and manganese. As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide a second metal selected from the group consisting of nickel, cobalt and manganese.

Claim 5: The rejection of claim 5 is as set forth above in claim 4.

Claim 6: Debe et al. on col. 10: 25 disclose a metal selected from the group consisting of nickel. As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide a second metal selected from nickel.

Claim 7: The rejection of claim 7 is as set forth above in claim 2.

Claim 8: The rejection of claim 8 is as set forth above in claim 6.

Claim 9: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the

invention was made to have modified the method and apparatus of Debe et al., to provide an atomic ratio of iron to nickel in second layer between 0.01 and 0.4.

Claim 10: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide an atomic ratio of iron to nickel in the second layer is between 0.01 and 0.15.

Claim 11: Debe et al. on col. 10: 25disclose a metal selected from the group consisting of cobalt. As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide a second metal selected from cobalt.

Claim 12: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide a planar equivalent thickness ratio of the first layer to the second layer between 0.3 and 2.5, and wherein the average bilayer planar equivalent thickness of the first and second layers is greater than 8 Å.

Claim 13: The rejection of claim 13 is as set forth above in claim 11.

Claim 14: The rejection of claim 14 is as set forth above in claim 12.

Claim 15: Debe et al. on col. 10: 25 disclose a metal selected from the group consisting of manganese. As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the

time the invention was made to have modified the method and apparatus of Debe et al., to provide a second metal selected from manganese.

Claim 16: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide an average bilayer planar equivalent thickness of the first and second layers of greater than 8 Å.

Claim 17: The rejection of claim 17 is as set forth above in claim 15.

Claim 18: As set forth above in claim 1, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., to provide an planar equivalent thickness ratio of the first layer to the second layer between 1.25 and 5.

Claim 19: Debe et al. disclose a method of making a fuel cell cathode catalyst comprising nanostructured elements which comprise microstructured support whiskers bearing nanoscopic catalyst particles, the nanoscopic catalyst particles made by alternating application of first and second layers (abstract) comprising platinum, iron and second metal selected from the group consisting of Group VIb metals, Group VIIb metals and Group VIIIb metals (col. 10: 14-36).

Debe et al. do not specifically disclose

a first layer comprising platinum and a second layer being an alloy or intimate mixture of iron and a second metal selected from the group consisting of Group VIb metals, Group VIIb metals and Group VIIIb metals other than platinum and iron,

where the atomic ratio of iron to the second metal in the second layer is between 0 and 10,

where the planar equivalent thickness ratio of the first layer to the second layer is between 0.3 and 5, and

wherein the average bilayer planar equivalent thickness of the first and second layers is less than 100 Å.

However, Debe et al. disclose that "The catalyst particles of the present invention may have alternating layers of different catalyst materials which may differ in composition, in degree of alloying or in degree of crystallinity. By varying the thicknesses of the
individual layers the stoichiometry of the bulk and the degree of alloying can be changed. By controlling which deposition sources are on or off and how much power is provided to the deposition sources during the final passes of the substrate in front of the sources, the surface composition can be controlled. The surface composition of the catalyst particle can have a different composition than the bulk composition of the particle." See col. 4: 27-40.

Further, Debe et al. disclose that "The process and apparatus of the present invention allow selective modification of the stoichiometry, degree of alloying, degree of crystallinity and crystallite morphology of the bulk of the catalyst coating as well as the surface composition. These can be changed by varying the relative deposition rates of the individual layers, by varying the power, throw distance, or duration of any of the sources. Furthermore, the composition and structure of the catalyst can be altered by including additional components in the sputtering gas. Any known sputtering gas

additives may be used, reactive or unreactive with the deposited material and whether incorporated into the catalyst as a constituent or dopant or not. Additives may include noble gasses, halogens, group VII elements, and preferably argon and oxygen. If sufficient isolation of the different vacuum deposition stations is provided, layered mixtures can be created which incorporate additives only in selected layers or which incorporate different additives in different layers." See col. 14: 52-61. See also col. 10: 14-36 and 55-59, col. 10: 63-col. 11: 3, and col. 12: 43-col. 13: 17.

Therefore, in light of the teachings of Debe et al., it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., which are similar to those instantly disclosed, to provide the claimed first and second layer compositions, atomic ratio, planar equivalent thickness, average bilayer planar equivalent thickness.

Claim 20: Debe et al. disclose on col. 13: 48-50 that vacuum deposition steps are carried out substantially in the absence of oxygen.

Claim 21: Debe et al. disclose that the platinum and the alloy or intimate mixture of iron and a second metal are deposited on microstructured support whiskers (abs.).

Claim 22: Debe et al. disclose that second metal is selected from the group consisting of nickel, cobalt and manganese (col. 10: 25).

Claim 23: Debe et al. disclose that second metal is nickel (col. 10: 25).

Claim 24: Debe et al. disclose a step of removing at least a portion of said alloy or intimate mixture of two metals after said deposition steps (col. 8: 30-47).

Claim 25: Debe et al. disclose a fuel cell cathode catalyst comprising nanoscopic catalyst particles made according to the method as set forth above in claims 23 and 19.

Response to Arguments

5. Applicant's arguments filed 25 May 2006 have been fully considered but they are not persuasive.

The Applicants argue, "...in order to establish a prima facie case of obviousness of a claim, all the claim limitations must be taught or suggest by the prior art...In the present case, no prima facie case of obviousness have been established because the cited reference fails to teach or suggest claim limitations recited in the present claims.

In response, the claim limitations are suggested in light of the teachings of Debe et al. as cited on col. 4: 27-52 and col. 14: 52-col. 15: 2.

In light of the teachings of Debe et al., it would have been within the skill of, or obvious to, one having ordinary skill in the art at the time the invention was made to have modified the method and apparatus of Debe et al., which are similar to those instantly disclosed, to provide the claimed limitations (see also col. 10: 14-36 and 55-59, col. 10: 63-col. 11: 3 and col. 12: 43-col. 13:17).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

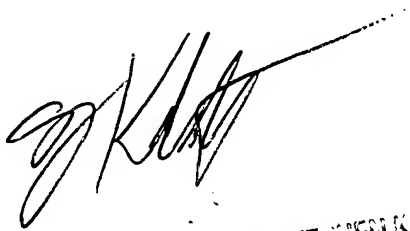
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Thomas H Parsons
Examiner
Art Unit 1745

STEPHEN KALAFUT
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